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MCZ newsletter

MUSEUM OF COMPARATIVE ZOOLOGY

Friends of the MCZ to go to India in 1984



Young male grey langurs play-fighting at Mt. Abu

Photos by James Moore



Jogi Mahal, a lake-side pavilion below the historic 10th-century Hindu fortress of Ranthambhore.

The next major natural history expedition planned for the Friends of the MCZ is a visit to India's nature sanctuaries accompanied by Dr. John D. Constable, founding member of the Friends of the MCZ (see p. 4), Professor Stephen Jay Gould, widely known for his writings on evolutionary biology, and Gabrielle Dundon, Director of Public Programs. The 24-day itinerary, leaving March 5, 1984, also includes visits to Bombay, Delhi, Jaipur, Agra (site of the Taj Mahal), and Kathmandu. An optional four-day extension to view Mt. Everest is planned. A descriptive brochure will be mailed to Friends of the MCZ in May.

In conjunction with the India expedition, an exhibition of photographs by graduate student James Moore and John D. Constable will be on display in the MCZ Gallery in the fall. The exhibit will cover a range of India's people and wildlife, focusing on the langurs studied by Moore at Mt. Abu (known to readers of Sarah Blaffer Hardy's *The Langurs of Abu*) and Ranthambhore (a little-known sanctuary with one of the highest concentrations of tiger, sambar, and chital in India). Moore, who has spent several field seasons conducting behavior studies on langurs, has been able to make special arrangements for the MCZ group to visit Ranthambhore.

The decision to go to India was the result of two meetings of the Friends Trip Committee whose members include John D. Constable, Gabrielle Dundon, Rosanne Kumins, Director James J. (Continued on page 6)

OEB Director of Administration Appointed



Dr. Jay Taft was appointed Director of Administration for the Department of Organismic and Evolutionary Biology (OEB) as of January 1, 1983. This new department and another, Cell and Developmental Biology, were formerly separate wings of the Department of Biology. OEB is composed of a far-flung group of professors some of whom work in the Biological Laboratories while most are associated with the various affiliated institutions including the MCZ, Arnold Arboretum, Gray and Farrow Herbaria, Botanical Museum, and the Harvard Forest in Peter-sham, Massachusetts.

Taft, a biological oceanographer from the Chesapeake Bay Institute at Johns Hopkins University where he studied phytoplankton growth and nutrition, welcomes the challenges of his new position. He sees his purpose as two-fold: "First, to help establish a single identity for this new department which is made up of historically separate sub-units; and second, to achieve the best possible administration at the least cost to all the units involved. While the institutions will maintain their separate identities within the department, consistent with their endowments and their longstanding scientific traditions, many aspects of their day-to-day operations will be administered by a single group of people." This first phase of Taft's work is currently underway. He is already combining the personnel and

graduate student administrative functions under the new Administrative Assistant for these areas, Mary Reynolds (see next article), and is now planning the centralization of the budget, accounting, and purchasing aspects of the administration. Integrating the building maintenance functions will be the next area to be tackled.

Taft's ultimate objective is "to have a unified administrative department in one place rather than the seven locations we have now. It takes me an hour just to say 'good morning' to everyone!"

Appointed OEB Administrative Assistant



Mary Reynolds joined Administrative Director Jay Taft of the new OEB Department as of March 1, 1983 when she was promoted to Administrative Assistant for the areas of personnel and graduate affairs. Reynolds had been Administrative Secretary to MCZ Director A. W. Crompton since 1977 and continued to work in that capacity for Professor James J. McCarthy when he assumed the directorship last July. Reynolds, who is enrolled in the Radcliffe Seminar Landscape Design Program, maintains a balance between pursuing her horticultural interests and juggling the myriad duties of her new position.

Wisconsin Museum Appoints Kirsch

John Kirsch, Associate Professor of Biology and Associate Curator in Mammalogy, will become Director of the University of Wisconsin

Zoological Museum as of July 1. Kirsch joined the MCZ staff in July, 1979 and has taught the Biology of Mammals course, Introductory Biology, a graduate seminar in marsupial diversity, and several tutorials. His two graduate students, Elizabeth Procter-Grady and Michelle Scott, are currently completing their Australian field work.

Under Kirsch's curatorship, the Mammal Department received an historic collection of Vermont mammals obtained over the span of most of this century, starting in 1914. Known as the Kirk collection, it includes apparently the earliest Vermont record of a vole, *Microtus chrotorrhinus*. Under Kirsch's administration, the Mammal Department staff has doubled and the equipment necessary to computerize the collection has been acquired. A new type catalog will be published within a year and the valuable types have been rehoused in new cases.

Kirsch looks forward to the challenges of his new position. He foresees a significant expansion of the Wisconsin museum's facilities and holdings. The museum, which essentially constitutes the Wisconsin state collections, already owns one of the largest collections of skeletons nationwide and he hopes to add to this. Other notable holdings include the Mossman collection of fetal membranes and a series of preserved brains. Kirsch will continue his teaching activities as an associate professor of the University. His dog, Apple, is also delighted with the move.

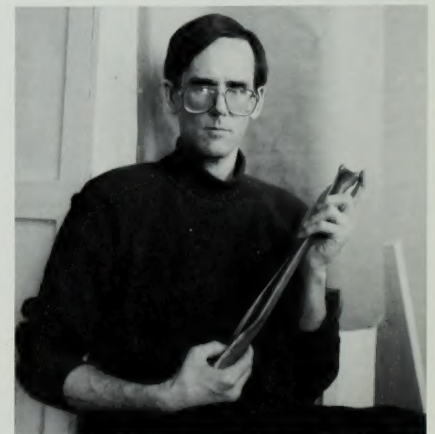


Photo by Rosamond W. Purcell

Staff Notices

With support of a Guggenheim Foundation grant, Professor A. W. Crompton will spend the next academic year completing several current projects on the origin of mammals with colleagues in England and China. He will also continue his collaboration with Dr. Alan Thexton of Guy's Hospital, London on the control of movement of the tongue. Crompton and his wife plan to sail across the Atlantic in mid-June aboard their 43-foot sloop and spend the next two summers sailing in the Mediterranean. He will return in the Fall to teach the first half of his course with Professor C. R. Taylor, *Structure and Function of the Vertebrates*.

P. Humphrey Greenwood, Senior Principal Scientific Officer at the British Museum (Natural History), is a Visiting Professor in the Fish Department this spring. He is sharing the teaching of Biology 130: Biology of Fishes, and also joining Professor Karel Liem and students in a research project on *Arapaima*, an airbreathing fish.

Professor **Ruth D. Turner**, Curator of Malacology, has just returned from a six-week visit to India at the invitation of the Indian Government Forest Research Institute. She participated in the planning of a new center for research on marine biodeterioration, which will assess the damage caused by woodboring molluscs and crustaceans and recommend preventative measures. India's fishing industry is particularly affected since the fishermen traditionally use wooden fishing boats. The annual loss to the woodboring bivalves reaches literally millions of rupees and the problem has been further aggravated in recent years because lumber has become a scarce commodity in India.

Turner also traveled extensively through the country revisiting working sites she had established during a 1965 visit, collecting specimens to add to the MCZ collections, and lecturing at several universities. She will return to India in January, 1984.

MCZ Archivist Branches Out

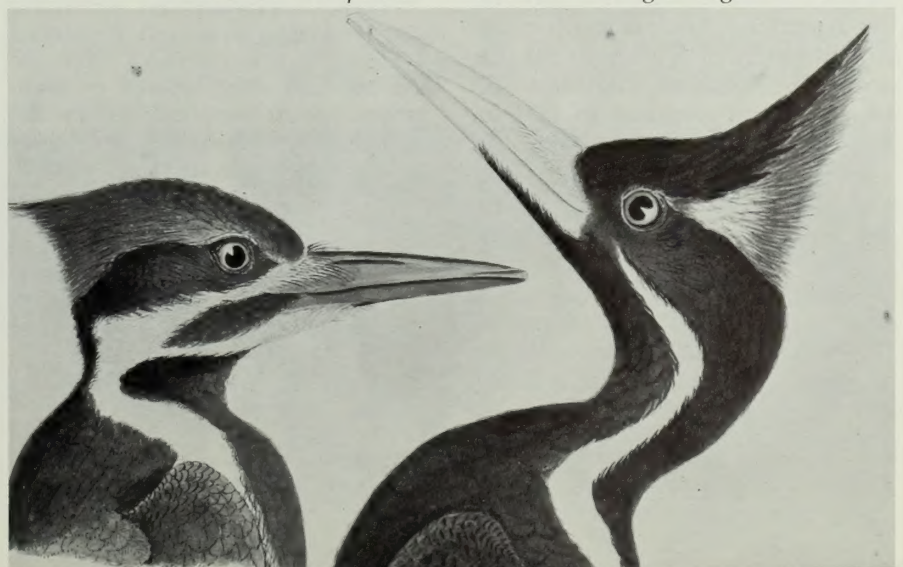
MCZ Library Archivist Ann Blum has developed her specialty, American 19th-century zoological illustration, into an extremely active second career. She is currently completing her book, *Drawn from Nature* (to be published by Pantheon Books in the fall of 1984), which chronicles how changes in the zoological illustrations of the last century reflect changes in scientific thought. Blum explains: "Three 19th-century revolutions, the industrial, the Darwinian, and the photographic, bore directly on zoological illustration. The book has a natural plot in that illustration techniques reflect the two halves of the century—pre- and post-Darwinian theory and pre- and post-photography."

She recently served as guest curator at the Peabody Museum of Salem where her exhibition, also entitled *Drawn from Nature* and including notable examples from the MCZ's collection, continues through the summer. She has also been taking her topic on the road. She has just returned from speaking on Charles Willson Peale's conviction of the unity of art and science at a symposium at the Amon Carter Museum of Western Art in Fort Worth, Texas in conjunction with a comprehensive exhibition of the work of this early American artist-naturalist. Sharing the podium were Professor John H. Ostrom from Yale and Joseph Kastner, formerly nature editor for *Life* magazine. The exhi-

bition, which has already been shown at the Smithsonian Institution, will move to the Metropolitan Museum of Art this summer. She also recently talked on the relationship of illustration and systematics in the nineteenth century at the Joint Atlantic Seminar on the History of Biology. Blum views the increased current interest in zoological illustration as a reflection of the renewed emphasis on systematics in biological studies.

Blum's personal evolution in her field dates back to when former MCZ Librarian Ruth E. Hill hired her to catalog the archival holdings because, according to Blum, "she thought I would enjoy the job. I knew nothing about the subject at the time." Blum says she fell in love with the illustrations, and took up drawing and print-making. In 1976, Director A. W. Crompton asked her to mount an exhibit from the collection and she found herself looking for an authoritative book on the subject, which did not exist. The exhibition led to an article for *Harvard Magazine*, co-authored with Sarah Landry, which in turn led to several offers for her to write the book that she needed. Blum will be teaching a course in the fall on the history of scientific and technical illustration (and looks forward to adding the physical sciences to her repertoire) in the Rhode Island School of Design's certificate program in scientific and technical illustration. This year-old program is co-directed by Margaret L. Estey and Whitney Powell, both of whom launched their illustration teaching professions at the MCZ.

Pileated woodpecker (l.) and Ivory-billed woodpecker (r.) drawn from life by Alexander Wilson about 1810. The pen and watercolor drawing belongs to the MCZ.



John Constable Plays Key Role at Vietnam Symposium

Dr. John D. Constable, a founding member of the Friends of the MCZ, Associate Clinical Professor at Harvard Medical School, Visiting Surgeon at Massachusetts General Hospital, and a Director of World Wildlife Fund-U.S., was among the 126 Vietnamese and American scientists who attended the International Symposium on Herbicides and Defoliants in War, the Long Term Effects on Man and Nature, in Ho Chi Minh City in January.

Constable played a number of roles both prior to and during the symposium. Although primarily a plastic surgeon specializing in burns and reconstructive surgery, he was also considered a forester by the Vietnamese and was one of eight scientists who were invited to travel into the forests and mangroves for the week before the conference to assess the damage caused by defoliants. Other Harvard forestry team members included Professors Peter S. Ashton, Director of the Arnold Arboretum, and Mark Leighton, Anthropology. Constable also delivered the tribute to Dr. Ton That Tung, the moving force behind this year's conference, who died in May, 1982, and served as rapporteur for his working group, which considered the possible effects of herbicides on human reproduction.

Constable originally went to Vietnam in 1970 as part of the Herbicide Assessment Commission of the American Association for the Advancement of Science under the aegis of Professor Matthew S. Meselson and returned in 1971 to collect additional specimens. In 1978 he visited Dr. Ton That Tung and took part in the planning for the symposium. As Constable noted in his tribute, Dr. Tung, director of the Viet Duc Hospital and head of the surgical faculty of the Hanoi Medical College, was a superb technical surgeon, a great



John Constable (far left), Peter Ashton (third from left), Mark Leighton (second from right), and other American and Vietnamese scientists inspect a teak plantation near Dalat.

Photo by Pham-Hoang Ho

hospital administrator, a great teacher and "a philosophical fighter for political and academic freedom who showed in his life how major a contribution one single person can make to a cause. . . . His interest and enthusiasm in the problem of herbicides make him truly the father of this Symposium."

The symposium included reports from eight working groups, four concerned with the ecological effects of the three major chemical warfare agents (Agent Orange, Agent White, and Agent Blue) employed by the United States during the mid to late 1960s, and the other four concentrating on the long-term human medical consequences. In summarizing the ecological findings, Constable points out:

"There is probably no significant long-term effect on the soil. We saw no evidence of heavy erosion, even the shifting land once covered by mangroves, which were reduced by the spraying to mudflats, did not appear to have undergone abnormal changes in their outline. The mangrove forests, extremely important to Ho Chi Minh City both as a fuel source and for piles for building, are being effectively, though laboriously, replanted by hand. A valuable forest will be restored within 20 years but it will be low in plant species variety and deficient in

wildlife unless the latter is specifically introduced. Agricultural land, except for additional fish ponds created by bomb craters, has largely recovered over the past 10 years. Long-lived trees, such as those in our fruit orchards, do not play a significant part in this tropical climate; the basic crop trees such as bananas and papayas are easily restored within 10 years. In some areas, particularly in the uplands, defoliation accelerated the progressive clearing of the forest to make way for agriculture that would eventually have occurred in any case.

The effects on the valuable evergreen forests depended upon the extent or severity of the chemical treatment. The effects of moderate spraying were similar to those resulting from heavy logging. Although all the large trees are dead, their seedlings have survived so that there should be a fair recovery of the vegetation over many decades. However, whether the birds and particularly the animals restricted to the high forest canopy will reappear is problematical. However, in those areas where defoliation exposure was sufficiently severe to reduce the forest to grass it seems unlikely to recover unless active steps are taken to control fires. During Vietnam's dry season, fires, whether natural or deliberately started to produce better grazing grass, occur with sufficient frequency that any large forest cannot invade the grassland and the fire in turn cannot invade the evergreen forest. Defolia-

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Mark Patterson Wins Best Paper Award

At the annual meeting of the American Society of Zoologists last December, fourth-year graduate student Mark Patterson received the "Best Paper Award" for graduate students and recent Ph.D's for his interdisciplinary approach to evaluating the efficiency of soft corals as filter feeders.



Patterson utilizes biomechanical and engineering techniques to investigate the passive filter feeding system of *Alcyonium*, a common Massachusetts soft coral. While active filter feeders such as sponges, mussels and clams have cilia pumps with which they create a current to attract plankton past their filters, the passive filter feeders are solely dependent not only on what the currents bring their way, but even on the existence of a current. While feeding in active filter feeders has been thoroughly studied for a century, only recently have marine biologists taken a quantitative approach to passive feeders. In attempting to model

the system with computer simulation, Patterson has to account for the fact that the food source, plankton, is not evenly distributed throughout the water, but moves in patches, traveling along rather like a swarm of mosquitos. Patterson is attempting to create a mathematical model showing how an animal should react to these passing patches of plankton.

Patterson explains the relatively new application of biomechanics to zoology in this way: "Biomechanics is a new, exciting field in biology. It takes the analytical tools of physics and the laboratory techniques of engineering and applies them to living things and how they work." While this approach has been used in medicine, where, for example, the mechanical forces exerted on a leg bone during walking are studied in order to make a better artificial hip joint, analyzing the fluid mechanics of how a coral catches minute plankton on a reef and how that affects the ecology of the system is a recent innovation.

To measure flow speeds underwater to ascertain the currents to which the coral is subjected, Patterson built a special underwater flow-meter. The currents are converted to an audio tone which is recorded on a small tape recorder which travels in an underwater housing. Later the tape is transcribed in the laboratory with the aid of a micro computer. Laboratory feeding experiments take place in a recirculating flow tank which has been designed to precisely control the flow over the soft coral colonies and to keep the same volume of water passing over the

colony so plankton concentrations can be monitored.

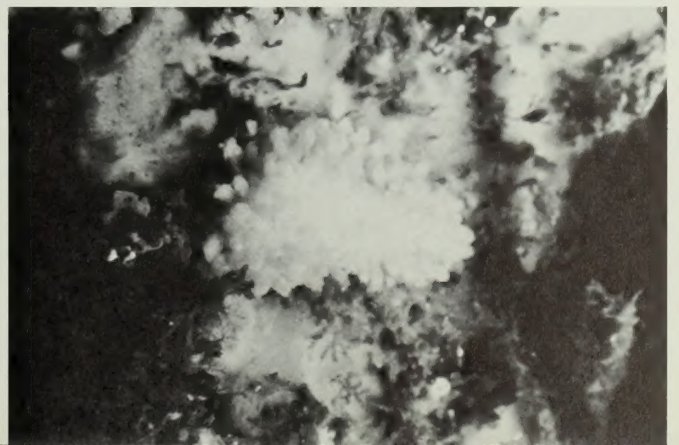
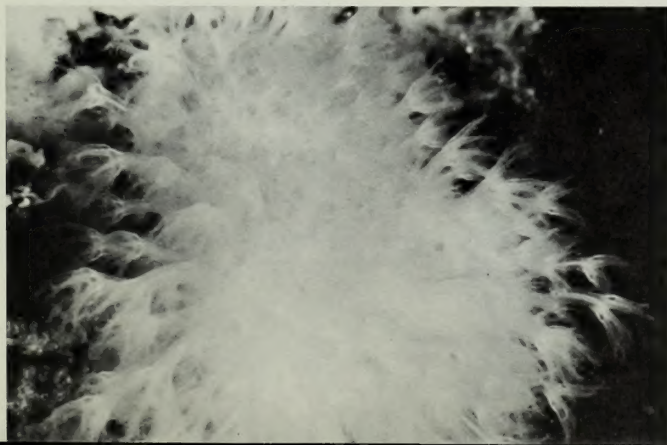
For his prize-winning talk Patterson figured out how the filters behave at different speeds and why the capture of plankton varies with flow speed. This is the first time an attempt has been made to quantify passive suspension feeding, which is the *modus operandi* of all coral reefs.

Patterson has now shifted his attention away from whole colonies and is concentrating on how the individual filter elements, the polyps, actually snatch plankton out of the water. Patterson is currently developing course material for an undergraduate tutorial entitled "Biomechanics of Plants and Animals" to be offered next year. He is also Resident Tutor in Biology at Kirkland House.

Patterson traces his interdisciplinary activities to his undergraduate years. In a physics course taught by Professor Fred Abernathy he was exposed to drag theory (and incidentally designed a rear-end for a Volkswagen) at the same time as he was working as a work-study student in Professor Ken Sebens' laboratory, making clay models of coral colonies and testing their drag rate in wind tunnels. This interest evolved into a senior thesis which Patterson wrote into an essay for the layman which won a Bowdoin Prize in 1979 (Harvard prize for distinguished writing which has been awarded annually since 1808). He became interested in how living organisms have evolved sophisticated solutions to engineering

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Two views of the same colony of the soft coral *Alcyonium*: (1), presenting a large surface area with its umbrella-like polyps extended to passing plankton-rich currents, and (r), shrinking surface area during a high velocity flow caused by a storm. Both photographs were taken at the same magnification.



India

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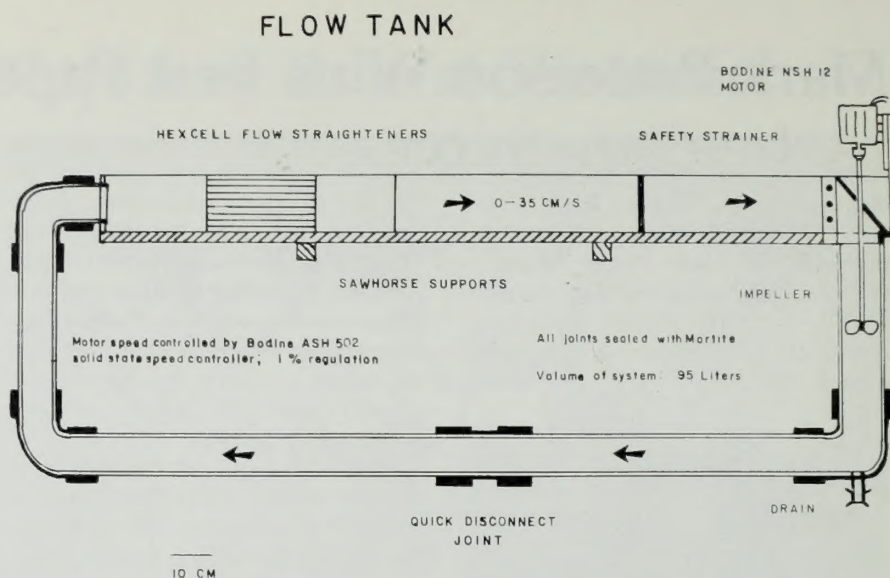
McCarthy, Charles Moore, Herbert Pratt, Sarah Robbins and Emily Scott. The Committee thoroughly explored the history of the travel program and formulated a set of recommendations based on the experience of the last two years especially. It was decided to plan one major unique expedition a year to areas that are still rich in wildlife and in general, not to repeat past trips. For the foreseeable future, 1983 is the last year that cruises to Baja California and the Galapagos Islands, and safaris to Tanzania will be offered. It was also decided to give Friends the opportunity to plan ahead to travel with the MCZ by announcing prospective destinations for a few years in advance. The Committee decided that Israel and Egypt, Borneo, and Sri Lanka would be the next three areas to be visited, probably in 1985, '86 and '87, respectively. Some of our Friends have expressed an interest in Papua New Guinea but the Committee thought that other areas deserve priority. The MCZ was a pioneer in developing local whalewatching trips and these will continue to be offered. This year's Bay of Fundy trip is already nearly filled, two weeks after announcement, and the Provincetown week-end has a waiting list.

Constable

(Continued from page 4)

tion has therefore apparently created a grass area large enough to be indefinitely maintained by fires, i.e., a permanent man-made savannah."

As for the conclusions of the study groups on the human physiological consequences of the defoliant spraying, the cancer group, while recognizing the apparently higher incidence of liver cancer, also recognized that there are so many other possible causes, including hepatitis B, that no ill effects could be directly attributed to the herbicide. The difficulties with any study conducted in South Vietnam is that it is hard to know for certain how much spraying a particular area received, making it



The recirculating flow tank diagrammed here, created by Patterson in the laboratory, allows flow speeds of almost a knot to be generated and permits close observation of soft coral feeding activity.

Patterson

(Continued from page 5)

problems (sometimes serving as models for human engineering

difficult to compare the medical data from various villages in the South. For this reason, of the seven papers prepared by Vietnamese scientists for the reproductive epidemiology group, the one considered of greatest immediate significance was a study carried out in the North of the reproductive history of 40,064 women, none of whom had been directly exposed to herbicides, all married to demobilized soldiers. The research team conducted interviews with each woman noting normal births and all the variations of unfavorable outcomes of pregnancy, which Constable terms "reproductive misadventures." A separate research team determined whether the husbands had served in the North or South and assumed that all who had served in the South were exposed to herbicides. The study showed that there was a statistically significant increase in the chance of reproductive misadventures for the women whose husbands had served in the South.

The other six Vietnamese studies were recognized as being not entirely acceptable in their present states for a variety of reasons, such as failure to factor in age as a

designs as in the case of submarine hulls imitating the shape of whales) which led to his interest in testing the efficiency of filter feeders.

variable. As regards congenital anomalies, the carefully-weighed unanimous opinion of the working group was:

"... there are several studies apparently indicative of a generally higher rate of their frequency amongst exposed women, but these changes are often hard to prove beyond doubt."

There was general agreement to continue the studies to answer some of the unresolved questions. No specific date for a future symposium was set.

New Books from MCZ Authors

Stephen Jay Gould: *Hen's Teeth and Horse's Toes*, W. W. Norton

Ernst Mayr: *The Growth of Biological Thought*, Harvard University Press

E. O. Wilson: *Promethean Fire*, Harvard University Press

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Editor: Gabrielle Dundon
Photographer: A. H. Coleman

Cambridge Public School/MCZ Partnership Successful

As the first year of her involvement with this MCZ's Cambridge School Program nears the end, Museum Educator Arlene Nichols is gratified with the progress of the program. She has found that, "this unique combination of working with students in the classroom and then being able to draw on the resources, staff, and volunteers of the MCZ have enabled me to develop thought-provoking activities that assist students in learning and practicing science skills. For example, after learning about insects, the students had to answer the questions: 'What would the impact be if this insect suddenly appeared ten times its normal size? How would this affect the citizens of Cambridge? Knowing what you do about their life cycles and food requirements, what would happen?'" Nichols got some interesting answers. One student speculated that a June bug $\times 10$, attracted by lights and bouncing against the window screen, would break the screen. Another answered that such an enlarged June bug would be too heavy to fly and would consequently starve. And as for other insects, several students projected that a mosquito ten times its normal size would cause widespread anemia.

Nichols has received willing assistance from the various departments; in particular, the Herpetology Department lent her enough specimens of representative reptiles and amphibia to enable the children to examine them closely and speculate as to the reasons why scientists put certain ones in the same phylum despite the great differences in their outer appearance. The Museum Guides have also been a source of ready assistance, joining parent volunteers in leading small group activities during museum visits.

The program, which is funded partially by Harvard's Office for Government and Community Affairs and by private and corpo-

rate contributions, currently serves third, fourth, and some fifth graders at the Peabody and Agassiz schools. Both Lee Miller and Kay Cox, the Masters of these schools, are eager to continue the program next year and a Parents' Advisory Committee, chaired by Drs. F. Ross and Lynda Holmstrom, is actively soliciting funds to support the program from the corporate community. Cambridge's new Coordinator of Science Dr. J. Arnold Webb is supportive of the program as is the Cambridge Parents' Science Advisory Committee, who would like to see the program become city-wide.

Director James J. McCarthy strongly supports this public education effort: "We believe that we can effectively assist the teachers of these children by providing a stimulating environment for the development of basic science skills. We start with a fundamental advantage: most children are truly fascinated by the exhibits of the museum. In the context of these resources we help young minds discover the basic principles of science by emphasizing the need for accurate observation, proper categorization, objective evaluation, and ultimately, both generalization and prediction. . . . Of greatest significance, though, is the opportunity we have to stimulate these children to see the need to understand the fundamentals of science regardless of the types of careers that may ultimately attract them."

Arlene Nichols, Museum Educator, makes a point during a visit by the Peabody School's third grade class. Ed Rader, free lance writer, takes part in the class to gather material for an article which appeared in the Cambridge Chronicle, April 28, 1983.



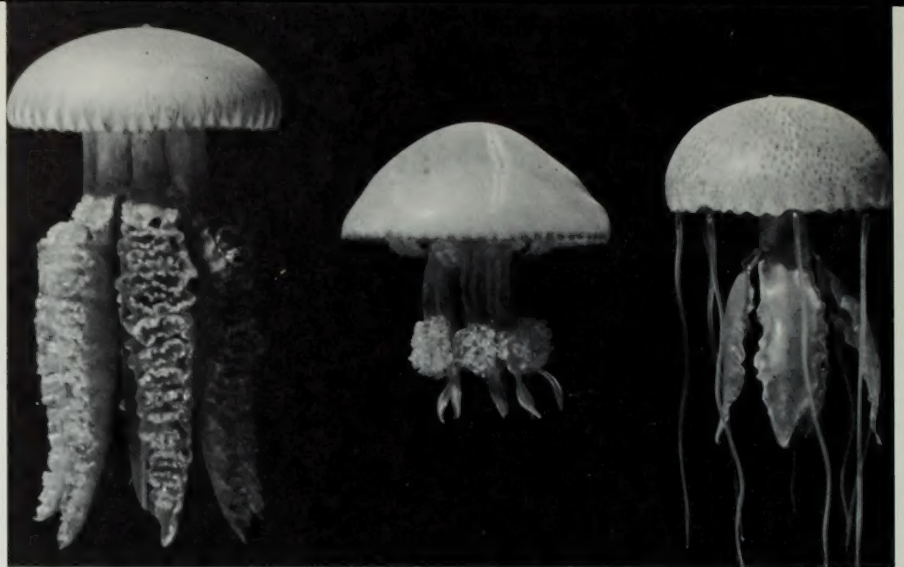
Fossil Slide Set and Lab Manual to be Published

The Invertebrate Paleontology Department is currently preparing a new teaching tool for students at the many institutions across the country that do not have comprehensive collections of invertebrate fossils. A 250-slide set including representatives of all the major groups for which fossils are known have been photographed by Michael Spampinato and will be distributed by W. H. Freeman and Company. A laboratory manual, edited by post-graduate student Tony Arnold including an introduction by Professor Stephen Jay Gould and chapters by Dr. Peter Williamson and graduate students Charles Mitchell, Warren Allmon, Judy De Forest, Dana Geary, Rebecca German, Rob Dorit, and Norman Gilinsky, will accompany the slide set. Such a cooperative venture by an entire department is a first for the MCZ.

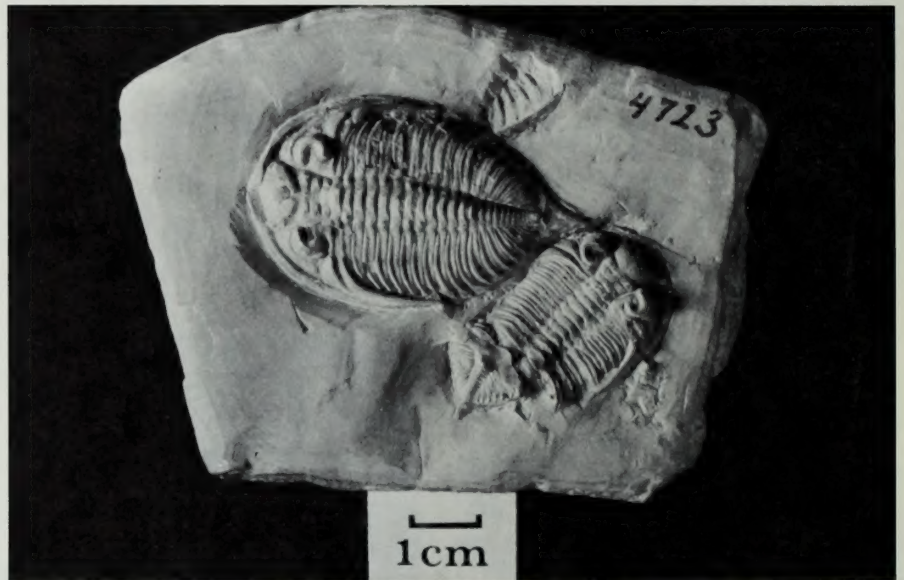
The MCZ's invertebrate paleontology collection is the fifth largest in the United States. The fossils are stored in $\frac{1}{3}$ of a million lots (cardboard boxes of various sizes) which occupy 15,700 drawers, measuring 18" by 28", on the first floor of the MCZ. Specimens were chosen for the slide set either for their historic significance or their outstanding quality.



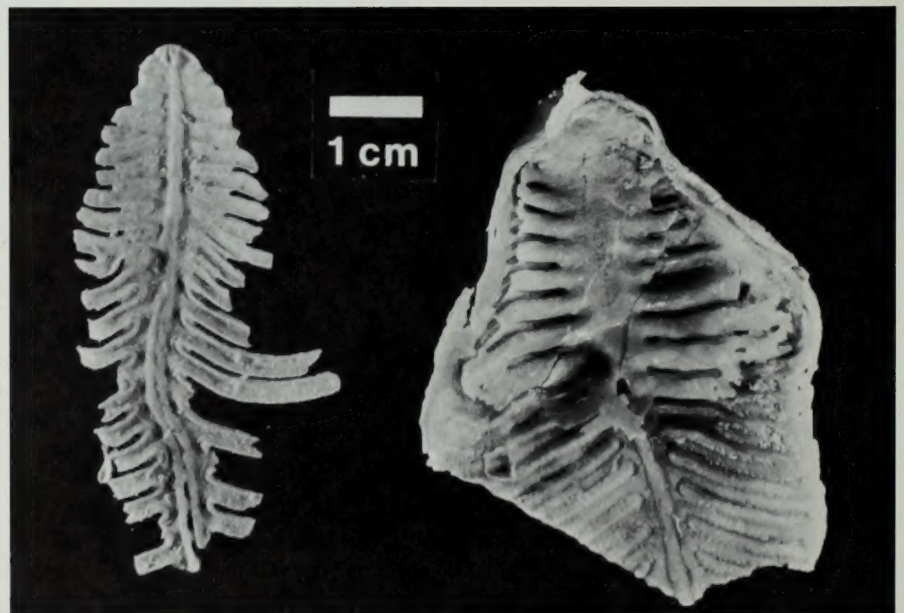
Emmonsia emmonsii, a middle Devonian coral



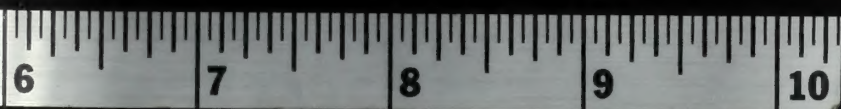
Glass coelenterates (l. to r.) *Pelagia noctiluca*, *Rhizostoma pulmo* Agassiz, *Crambessa togii*



Dalmanites vulgaris, a Silurian trilobite



Leptodus sp. a Permian brachiopod from the Glass Mtns. of Texas



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